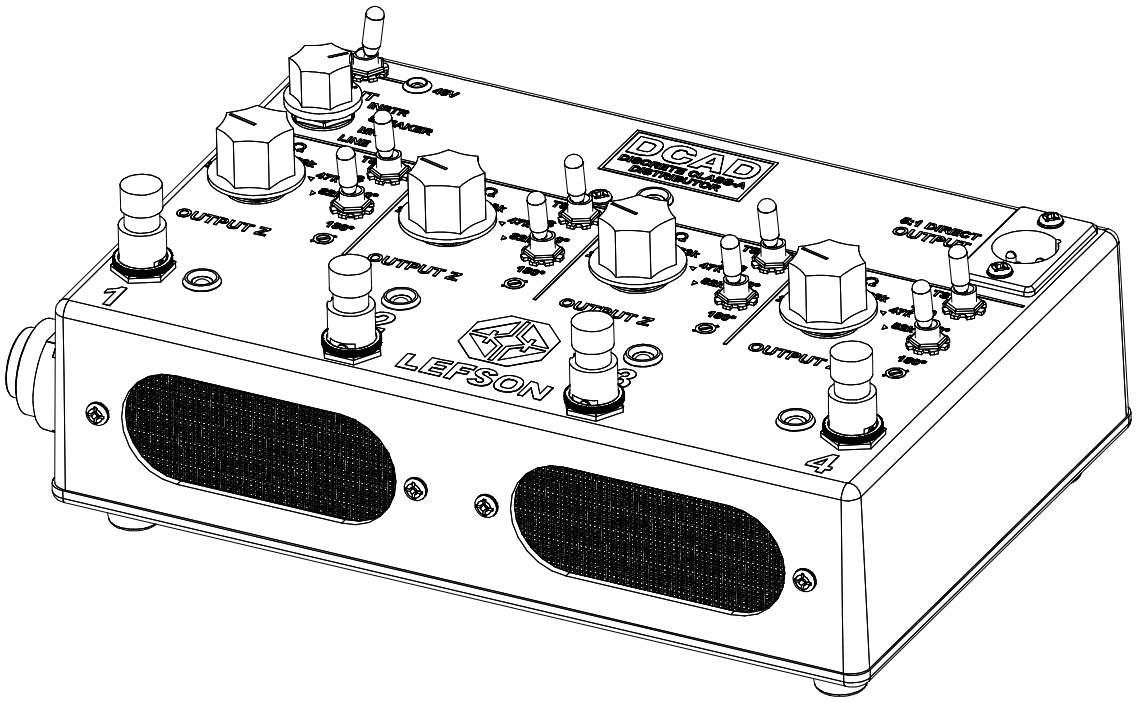
DCAD

DISCRETE CLASS-A DISTRIBUTOR



USER MANUAL

LEFSON

BP 383
62205 BOULOGNE-SUR-MER CEDEX
FRANCE

SIRET : 79336616200014

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SAFETY

INSTRUCTIONS

All the rules listed below apply to the Lefson *BT36* and *DCAD*

PROTECTION OF PERSONS

The *DCAD* has some electromechanical protruding parts : lever switch, foot switch and command buttons. These elements combined with the weight of 1.7 kilogram of the device, can cause some physical discomfort or minor injuries in a fall or sharp contact with any part of the human body. The *DCAD*, as any other electronic device, should be used only under the conditions mentioned in this user manual. Here are the main points about the human person, mentioned in a random order :

Never open or modify in any way the device (*DCAD* or *BT36*).

Never store or use the device in harsh environments subject to extreme temperatures, high humidity levels, any wet contact surface or water spray, high levels of vibration, dust of any matter.

Never handle or use the *DCAD* with your hands or other parts of the body, wet or even damp.

Always place the unit in a stable position. Never place it in equilibrium, in inclination or supension.

Always power the *DCAD* with its *BT36* dedicated supply.

Never excessively twist or bend the power cords. Never walk on or cover them with heavy objects. Do not follow this rule may result in degradation of cords or cables causing malfunctions, failures, bad contacts or in the worst case some short circuits. Deterioration of these elements can cause electric shock or fire starts.

Never make possible intrusion of material inside the device, whether it be solid or liquid, gas or other flammable components.
In places where children are present, always supervise them. Particular attention is to be observed among the youngest. It is imperative to prohibit and prevent the use of the device by any child who is not old enough to understand all the rules of the user manual attached to the product.

Never disassemble in any way the device. If disrespectful unscrewing the housing of the device, a button or an other object, be sure to perfectly replace anything. Never leave any part of the device, out of sight or reach of children especially in infancy. Never forget that a child will have for first reflex to bring to one of his five senses any object that he doesn’t know. The risk of accidental swallowing which can be fatal must be constantly controlled.

The device must be protected from any shock that might cause mechnical external, or intern damages that may cause short circuit, overheating, fire or other risk events.

It is essential to ensure that the *BT36* and all equipments used, are properly grounded to the electrical installation.

The power cable is used as disconnecting tool. The AC power socket must be installed near the equipment and easily accessible.

DEVICE PROTECTION

The devices must be used in an aerated or ventilated place. Do not place them too close each other, so as not disturb their heat dissipation.

When connecting or disconnecting the *DCAD* or the *BT36*, always hold the connector (plug), not the cable or cord.

Periodically it is necessary to clean the power connectors with a dry cloth to remove any dust on their electrical contact surfaces. Be sure to unplug the power transformer (*BT36*) prior to the operation. An accumulation of dust on an electric surface can induce a risk of fire.

Avoid to entangle cables or cords. Always dispose them orderly and put them out of reach of children.

Never place heavy objects, or exercising any pressure, on the unit or against one of its surfaces.

Never carry or use the device, the power transformer, or any cable, cord or connector by hand or other part of the body, wet or just damp.

In the event of a storm, or long inactivity, always disconnect the power transformer (*BT36*) from the mains voltage.

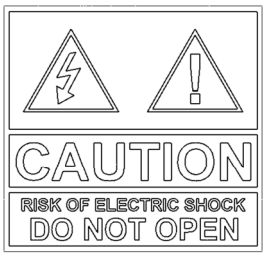
Before cleaning the device or anything else, be sure to disconnect the *BT36* from the mains voltage.

Never short circuit the connector of the power cord, otherwise overheating and fire risk from the power transformer.

If disrespectful unscrewing the housing of the device, a button or other object, be sure to fully replace any element, to not create areas suitable for the intrusion of foreign bodies.

In case of smoke from the device, odor, noise or visual doubtful manifestation, immediately unplug the transformer (*BT36*) from the mains voltage and contact the Lefson company.

This exclamation point on the product is intended to alert the user about the presence of important information provided in the user manual. It is important to read them before any other action.



These icons on the cover of the Lefson *BT36* are intended to alert the user about the presence of high voltage inside the device and thus, the imminent risk of electric shock if disassembling the unit. All information relating to the safety are listed in this user manual. It is essential to read it before use.

NOTICE TO CUSTOMERS

The *BT36* and *DCAD* are delivered with a warranty card which must be completed and returned by the user to be validated and taken into account. Remember to use the correct value of powering according to the voltage in the country of use. Any breach of any rule in this manual will cancel the warranty of the equipment.

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Declaration of conformity

. **Application of directives :** 2006/95/CE – 2004/108/CE

. **Standards to which conformity is declared :**

- CISPR22 (2008)
- CISPR24 (2010)
- IEC 61000-3-2 (2009)
- IEC 61000-3-3 (2008)
- Publication CFR47 part 15 of 2012
- ICES-003 of 2012
- IEC 60950-1:2005 (2nd Edition) + Am1:2009
- EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011

. **Manufacturer's name :** LEFSON

. **Manufacturer's adress :** BP 383 – 62205 Boulogne-sur-Mer Cedex – France

. **Type of equipment :** Class-A Audio distributor, with its 115/230V external power supply

. **Name of the model :** DCAD + BT36

. **Notified body :** LCIE Bureau Veritas – Fontenay-aux-Roses – FRANCE

I, the undersigned, hereby declare that the equipment specified above conforms to the above directives and standards.

Boulogne-sur-Mer, October 21, 2013

XAVIER LEFEBVRE
Director, engineer

LEFSON

INTRODUCTION

Congratulations and thank you for choosing a Lefson *DCAD*. This device is the result of hundreds hours of research and audiophile electronic experimentations. Everything in the Lefson *DCAD* has been carefully designed to assure you of exceptional performance regardless of the circumstances.

We are sure that this device will provide you hours of listening pleasure, satisfaction, and that it will quickly become an indispensable tool for developing your creativity.

Your *DCAD* and its dedicated *BT36* power supply are designed according to strict rules. The quality of any element was taken into account.

The *DCAD* is an audio class-A distributor. Its circuits are made of high-quality analog components. It is assembled in our workshop in France, entirely by hand, according to our own rules of assembly and testing procedures. Before being sold, your *DCAD* was electrically and audibly measured to ensure an optimal operation in the coming decades.

Prior to any action, please take the time to read this manual completely, beginning with the safety instructions previously outlined.

100% Analog, 100% Discrete, 100% Class-A

Nowadays it is usual to use audio distributors. One often underestimate the importance of these devices. Generally located at the beginning of the audio chain, they influence the audio signal through its full path.

This is about what Lefson decided to impose itself by creating an unique device, the *DCAD* : Discrete Class-A Distributor.

Its analog circuitry of audiophile quality demonstrate that it’s all about discipline, intransigence and know-how.

The *DCAD*, with its incredible sonic performances, innovations, and the accuracy of its many options, will satisfy both the instrumentalist and the most experienced engineers. The device is designed to resolve technical disputes occurring during studio recording or on stage.

DESCRIPTION

The Lefson *DCAD* "Discrete Class-A Distributor" is an audio distributing device with five active outputs. This unit, like all of the Lefson brand, is particularly designed for audio professionals. It is able to duplicate any audio signal applied on one of its three inputs "INSTR, SPEAKER, MIC/LINE", perfectly on six outputs, simultaneously. One of these outputs, called "THRU" is directly connected in parallel to the "INSTR" input. Four others, "ISO 1" to "ISO4" are equipped with their own active circuit, an electrical isolation, and can be enabled or disabled by a dedicated foot switch. A last one, "5:1 DIRECT OUTPUT" is always enabled and has the same isolation as the four previous.

The selection of the various options of operation is performed by multiple switches and a potentiometer. Their role is illustrated by a screen printing directly on the device. The visualization of the power of *DCAD*, the activation of the four outputs "ISO1" to "ISO4", and the activation of 48V power, is made possible by the use of LED indicators of different sizes and colors.

All the audio sockets of the DCAD are manufactured by the famous NEUTRIK company.

The Lefson DCAD can be connected to any other device with a standard +4dBu or -10dBu audio level. As the outputs active stages are provided with low impedance and balanced circuitries, the Lefson DCAD is very "strong" with electrical charges that are submitted to it and can be connected to other devices with long cables, while minimizing the various problems related to the interference phenomena. Many safeguards are implemented in both the supply and the audio circuit, allowing the DCAD to withstand many bad conditions of use without its overall operation being disturbed or damaged.

To operate the *DCAD* needs to be connected to an alternative 36V power supply : the Lefson *BT36*. It only consists of a transformer, as all elements like rectifiers and filters, generating the voltage required to operate the active electronics, are included into the DCAD. To be sure to get the best results, LEFSON has decided to use an high-end AMPLIMO toroidal transformer. This choice has been validated by many audio tests.

GETTING STARTED

The Lefson *BT36* is dedicated to the Lefson *DCAD*. It was designed to power it with 36V alternative low voltage.

As the outputs of the *DCAD* are floating, **it is essential to ensure that the *BT36* and all equipment used are properly grounded to the electrical installation.**

To get started the *DCAD* with the *BT36*, it is imperative to proceed in the following order:

1- Check that the two slide switches « VOLTAGE SELECTION » of the *BT36* are in a similar position corresponding to the value of the main voltage in your country, 115V or 230V.

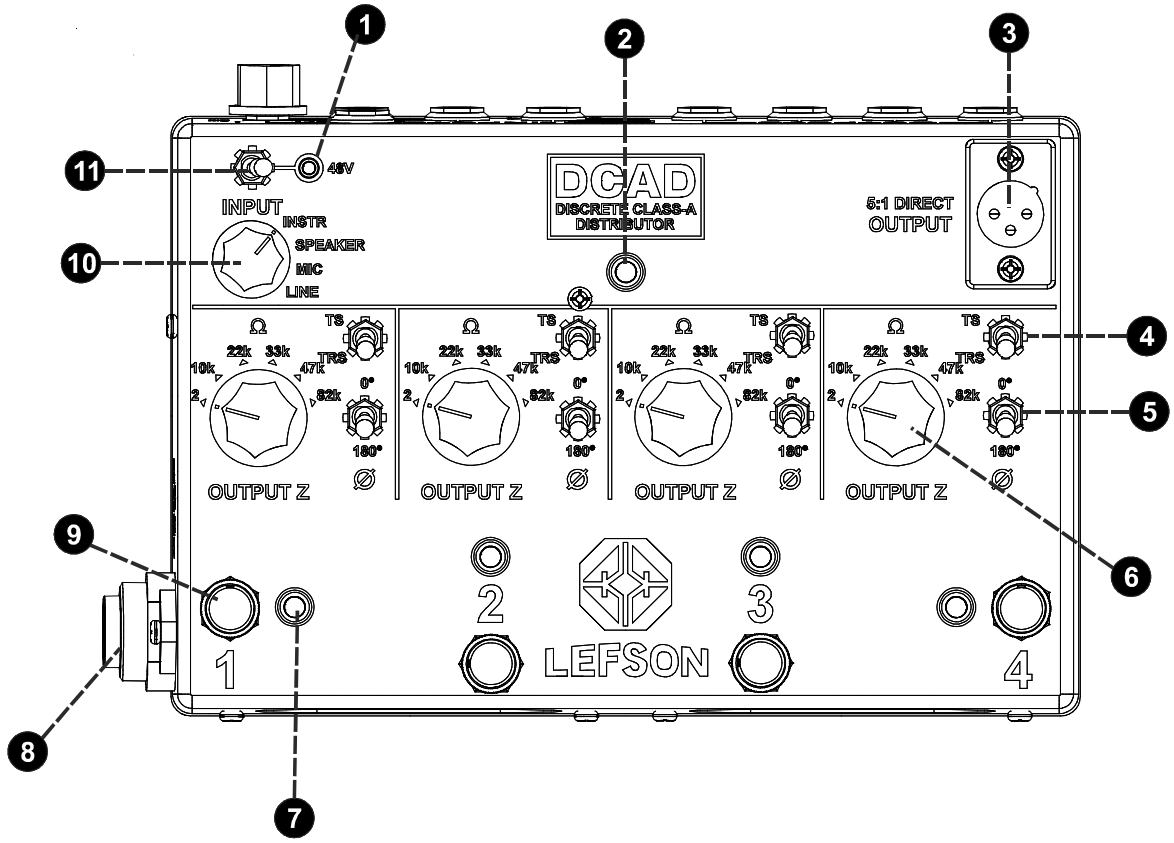
2-Connect the *DCAD* to the *BT36* with the provided AC 36V 4 pins power cable.

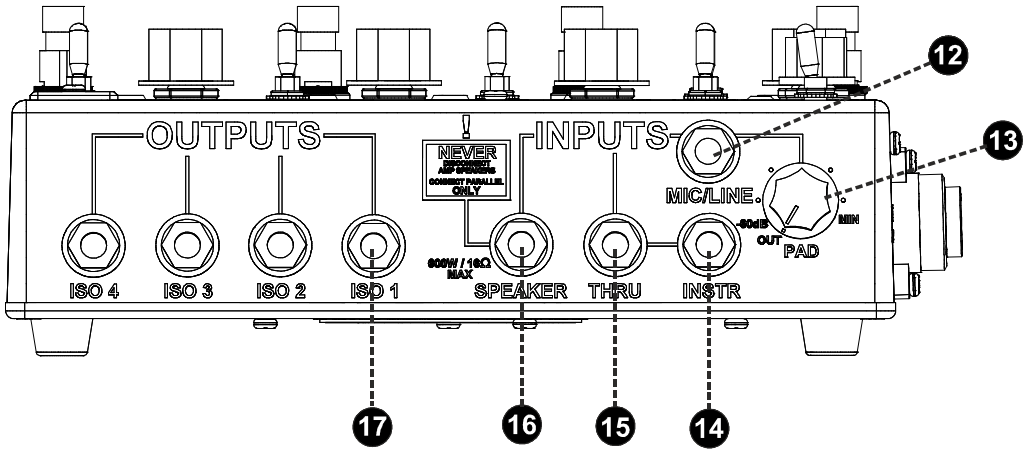
3-Connect the AC main power cable to the *BT36*, ***then*** to the main power socket.

4-Flip the "POWER" switch in "I" position. The red indicator of the *BT36* is now lighting, like those of the *DCAD*.

DESCRIPTION OF THE ARCHITECTURE

DCAD





1……Light indicator of the 48V phantom power activation
2……Power LED indicator
3……XLR socket of the 5:1 DIRECT OUTPUT
4……Unbalanced/balanced (TS/TRS) selector of the ISO 4 output
5……Phase inverter of the ISO 4 output
6……Impedance selector of the ISO 4 output
7……Light indicator of the ISO 1 output activation
8……Socket of the 36 Vac power supply
9……Foot switch of the ISO 1 output activation
10……Input source selector
11……Activation switch of the 48V phamtom power supply
12……JACK socket of the MIC/LINE input
13……PAD attenuator knob
14……JACK socket of the INSTR input
15……JACK socket of the THRU output
16……JACK socket of the SPEAKER input
17……JACK socket of the ISO 1 output

1.Light indicator of the 48V phantom power activation

As soon as the 48V phantom power is activated, this orange LED lights up. 48V voltage is then present on the MIC/LINE socket.

2.Power LED indicator

Once the unit is turned on, this green LED lights up, indicating a proper operation.

3.XLR socket of the 5:1 DIRECT OUTPUT

The connection to the balanced 5.1 DIRECT OUTPUT is performed using a 3 pins male XLR socket.

4.Unbalanced/balanced (TS/TRS) selector of the ISO 4 output

This selector determines the coupling of the ISO 4 output. The description here applies too to the ISO 1, ISO 2 and ISO 3 outputs. In TS position the output is unbalanced, and in TRS position it is balanced.

5.Phase inverter of the ISO 4 output

The reversed-phase inverter, as its name suggests, reverse the phase of the audio signal. This concept of inversion is important to understand: the signal phase is shifted in time but instantly reversed. This inversion occurs over an interval of a half period of the signal or 180 °. The term of « opposite phase » is generally used. In position 0 ° the phase signal is not changed, and in position 180° the signal is 180 ° out of phase. The other three outputs ISO 1, ISO 2 and ISO 3 also have such an inverter.

6.Impedance selector of the ISO 4 output

This rotary switch determines the impedance of the ISO 4 output. Six values are available : 2 Ohm, 10k, 22k, 33k, 47k, 82k Ohm. The user has the choice between a very low output impedance and high output impedance. The purpose of it is to simulate the impedance of an instrument microphone. In some configurations it will produce a different sound because it is possible that the user connects the *DCAD* to devices which will respond very differently if they are driven by low impedance signals. However if no requirement is requested, the low output impedance should be preferred. This choice preserves the audio signal from dropouts. The other three outputs ISO 1, ISO 2 and ISO 3 also have such a selector.

7.Light indicator of the ISO 1 output activation

As soon as the ISO 1 output is activated, this red LED lights up. The other three outputs ISO 2, ISO 3 and ISO 4 also have such a LED.

8.Socket of the 36 Vac power supply

This socket (BINDER 711 type) must be connected to the dedicated Lefson *BT36* power supply, thanks to the provided cable. Never leave the *BT36* on when the BINDER 36 Vac power socket of the *DCAD* is not connected.

9.Foot switch of the ISO 1 output activation

ISO 1 output can be turned on or off (muted) depending on the position of the foot switch. It has two positions: on or off, it enables or disables the output. The other three outputs ISO 2, ISO 3 and ISO 4 also have such a foot switch.

10.Input source selector

The INPUT source selector allows to select the input to use : INSTR, SPEAKER, MIC, LINE. As the SPEAKER input is designed to process very high level signals, **IT IS IMPERATIVE NOT TO BE CONFUSED WITH ANOTHER ONE.**

11.Activation switch of the 48V phamtom power supply

This switch allows to enable or disable the 48V phantom power.

12.JACK socket of the MIC/LINE input

This 6.35mm balanced jack socket is designed to receive signals from microphones or –10/+4 dBu lines. If the 48V phantom power is not requested, care must be taken to disable it with the #11 switch.

13.PAD attenuator knob

This knob allows the adjustment of the PAD attenuator. In OUT position, the attenuator is disabled. The adjustment range is between –60dB and the MIN positions.

14.JACK socket of the INSTR input

This 6.35mm unbalanced jack socket is designed to receive the high impedance signal of any electrical or electro-acoustic instrument (guitar, bass, cello, bass, synth ...) and more generally any asymmetric signal source (dynamic microphone, –10/+4 dBu line output, pedal and dynamic or time effect processor...).

15.JACK socket of the THRU output

This 6.35mm unbalanced jack socket allows a parallel connection to the #14 INSTR input. Be careful because its use will change the overall input impedance of the *DCAD*. If the THRU output is used, the input impedance of the *DCAD* becomes equivalent to the input initial impedance of the *DCAD* in parallel with the input impedance of the device connected to the THRU input. This may be needed if the user does not want to disturb the sound of its configuration, established before the acquisition of *DCAD*.

16.JACK socket of the SPEAKER input

This 6.35mm unbalanced jack socket is designed to receive the signals of very high power amplifiers, including instruments amplifiers (guitar, bass, synth ...). From a parallel connection to the speakers, the great advantage of such a connection is to recover the sound of the power amplifier in use. Each amplifier has its own sound, its own sound signature. In the case of an instrument amplifier, it becomes possible to "capture" the sound signature of the preamplifier stage with the power amplifier stage. It is thus possible to make live sound takes using direct connections. The amplifier must have at least one speakers parallel output. If it is not the case, do not use this option. The SPEAKER input of the Lefson *DCAD* can receive signals from an amplifier whose power does not exceed 600W under 16 Ohm, in other words : an AC signal up to 42 dBu.

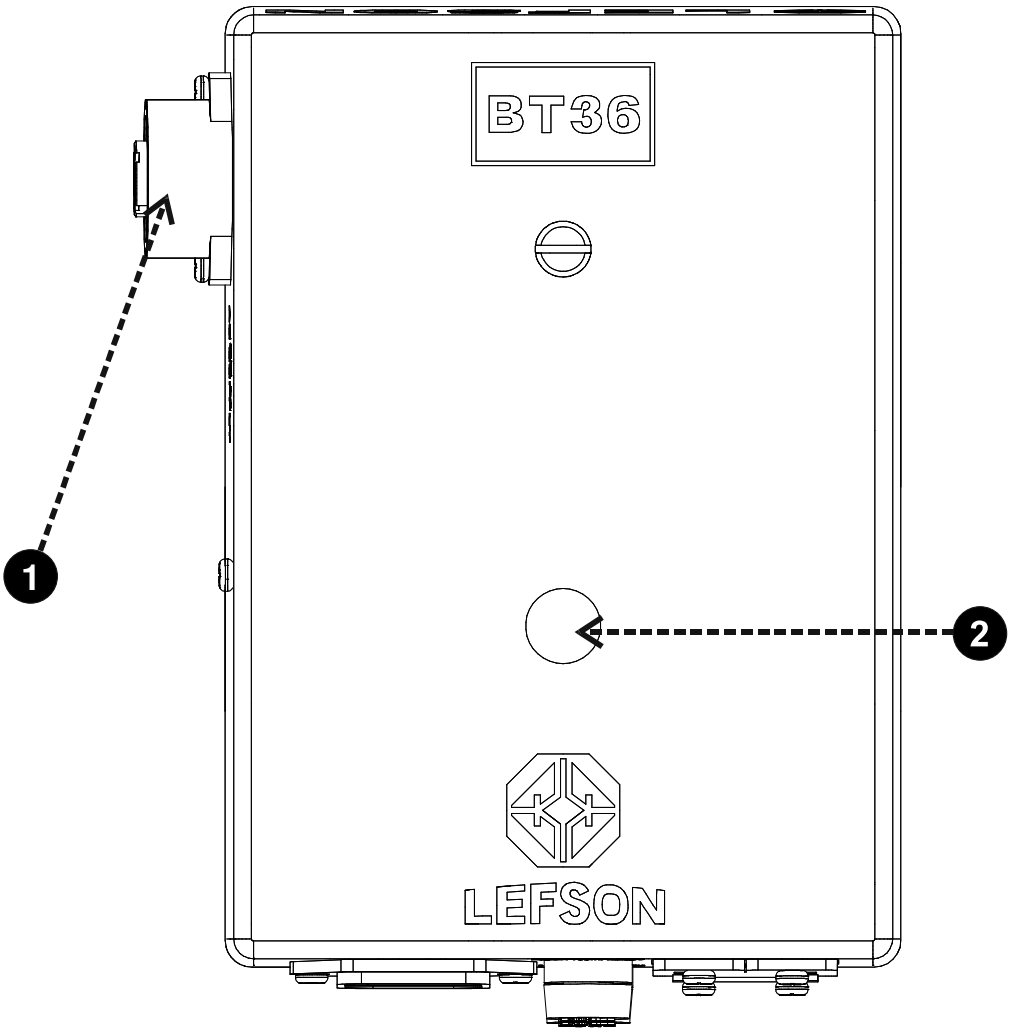
NEVER USE AN INSTRUMENT AMPLIFIER WITH ITS SPEAKER(S)DISCONNECTED.

Familiar users with instrument amplifiers can assimilate this option as an auxiliary power output of the audio signal.

17.JACK socket of the ISO 1 output

This 6.35mm jack socket is the connection of the ISO 1 output. The description here applies to the ISO 2, ISO 3 and ISO 4 outputs. The output circuit has its own active CLASS-A transistor and total galvanic isolation transformer. It can be unbalanced or balanced.

- BT36 -


BT36
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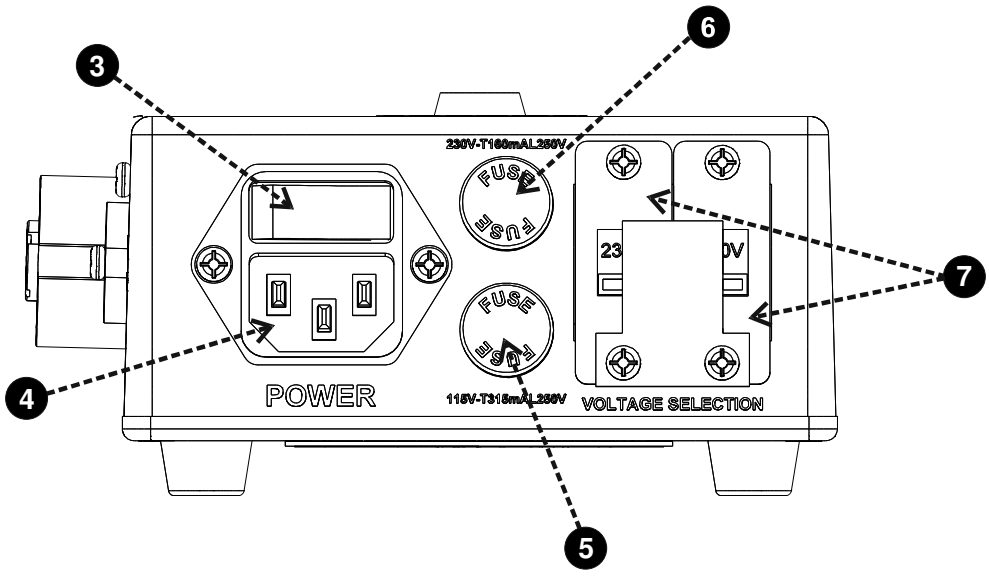

3
6
7
4
5
230V-T160mAL250V
FUSE
FUSE
115V-T315mAL250V
POWER
VOLTAGE SELECTION

1.Socket of the 36Vac power supply

The female ***36 V AC SUPPLY*** socket provides power to the Lefson *DCAD* using the supplied cable.

2.Light indicator of the power supply

This indicator allows to visualize the powering of the *BT36*.

3.Power switch

This ***POWER*** switch is used to power on or off the *BT36*.

4.Socket of the main power supply

This male socket provides the main 115V or 230V power to the Lefson *BT36* using the supplied cable.

5.115V-T315mAL250V fuse holder

Before removing anything, **ALWAYS ENSURE TO DISCONNECT THE UNIT FROM THE MAINS POWER**. Quick access to the fuse is available through this holder. Just grab its cap by pushing it slightly and then turning to the left. If necessary, always try to replace the fuse by another one of the same value : T315mAL (T:temporised), 250V.

6.230V-T160mAL250V fuse holder

Before removing anything, **ALWAYS ENSURE TO DISCONNECT THE UNIT FROM THE MAINS POWER**. Quick access to the fuse is available through this holder. Just grab its cap by pushing it slightly and then turning to the left. If necessary, always try to replace the fuse by another one of the same value : T160mAL (T:temporised), 250V.

7.Voltage Selectors

BEFORE POWERING THE *BT36*, ALWAYS CHECK THAT THOSE SELECTORS MATCH THE CORRECT POSITION CORRESPONDING TO THE VALUE OF THE USED VOLTAGE. If the *BT36* is supplied from a 115V mains, place both selectors in 115V position (up). If the *BT36* is supplied from a 230V mains, place both selectors in 230V position (down). Both selectors **ALWAYS** must be used in a similar position.

SPECIFICATIONS

– *DCAD* –

Environmental Specifications*	
Operating temperature	+5 à 30 deg. C
Relative humidity	20 à 80 %
*Altitude***	0 à 3000m

*Recommended operating

** Above sea level

Physical Specifications	
Dimensions (mm)	239,8 x 161,1 x 87,8
Dimensions of the box (mm)	222,3 x 146,6 x 54,9
Weight	1770g
Supply	External 36 Vac – Lefson *BT36 – 4 pins cable*
Power	6.1 W

Peak Level **Terms : load = 600ohms ; frequency = 1kHz**	
***INSTR** input*	+25dBu (internal limiter)
***SPEAKER** input*	+42dBu
***MIC** input*	+11dBu (PAD out + internal limiter)
***LINE** input*	+25dBu (PAD out + internal limiter)
***ISO1** to **ISO4** outputs*	+23dBu
***5:1 DIRECT** output*	+9dBu

Impedance **Terms : frequency = 1kHz**	
***INSTR** input*	1.7M ohms
***SPEAKER** input*	68k ohms
***MIC** input*	1k ohms
***LINE** input*	3k ohms
***ISO1** to **ISO4** outputs*	2/10k/22k/33k/47k/82k ohms
***5:1 DIRECT** output*	0.08 ohms

Frequency Response

Terms : – measurement reference = 1kHz
– source = 1 Volt RMS ; 50ohms

***INSTR** input --> **ISO1 to ISO4** outputs*	+0.9dB ; 20Hz to 100kHz
***INSTR** input --> **5:1 DIRECT** output*	+/–0.3dB ; 20Hz to 100kHz
***LINE** input --> **ISO1 to ISO4** outputs*	+0.5/–3dB ; 20Hz to 60kHz
***LINE** input --> **5:1 DIRECT** output*	–3dB ; 20Hz to 60kHz

Gain

Terms : – source = 1 Volt RMS/50ohms ; frequency = 1kHz

***INSTR** input --> **ISO1 to ISO4** outputs*	1.004
***INSTR** input --> **5:1 DIRECT** output*	0.194
***SPEAKER** input --> **ISO1** to **ISO4** output*	0.0099
***SPEAKER** input --> **5:1 DIRECT** output*	0.0019
***MIC** input --> **ISO1** to **ISO4** outputs*	4.990
***MIC** input --> **5:1 DIRECT** output*	0.970
***LINE** input --> **ISO1** to **ISO4** outputs*	1.247
***LINE** input --> **5:1 DIRECT** output*	0.241

Signal to Noise Ratio

Terms : – source = +12dBu/600ohms ; frequency = 1kHz
– 80kHz low-pass filter

***INSTR** input --> **ISO1** to **ISO4** outputs*	< 94dB
***INSTR** input --> **5:1 DIRECT** output*	< 91dB
***LINE** input --> **ISO1** to **ISO4** outputs*	< 96dB
***LINE** input --> **5:1 DIRECT** output*	< 91dB

Common Mode Rejection Ratio (CMRR)

Terms : – source = +18dBu/50ohms
– ground referenced
– 80kHz low-pass filter

***MIC** input*	< 95dB @ 20Hz < 75dB @ 1kHz < 55dB @ 10kHz
***LINE** input*	< 90dB @ 20Hz < 70dB @ 1kHz < 50dB @ 10kHz

Total Harmonic Distortion (THD)

Terms : – source = 1 Volt RMS/600ohms ; frequency = 1kHz
– 80kHz low-pass filter

***INSTR** input --> **ISO1** to **ISO4** outputs*	< 0.009 %
***INSTR** input --> **5:1 DIRECT** output*	< 0.008 %
***LINE** input --> **ISO1** to **ISO4** outputs*	< 0.016 %
***LINE** input --> **5:1 DIRECT** output*	< 0.014 %

Inputs/Outputs Types	
INSTR *input*	Unbalanced
SPEAKER *input*	Unbalanced
MIC/LINE *input*	Balanced
THRU *output*	Unbalanced
ISO1 *to* ***ISO4*** *outputs*	Unbalanced / Balanced – Floating
5:1 DIRECT *output*	Balanced – Floating

Types of Connections	
36V AC *power supply*	BINDER 693 PIN 1 : AC 36V (live) PIN 2 : AC 36V (neutral) PIN 3 : NC PIN E : Earth
INSTR *input*	NEUTRIK – JACK TS – 6.35mm TIP : Signal SLEEVE : Ground
SPEAKER *input*	NEUTRIK – JACK TS – 6.35mm TIP : Signal SLEEVE : Ground
MIC/LINE *input*	NEUTRIK – JACK TRS – 6.35mm TIP : (+) Signal RING : (–) Signal SLEEVE : Ground
THRU *output*	NEUTRIK – JACK TS – 6.35mm TIP : Signal SLEEVE : Ground
ISO1 *to* ***ISO4*** *outputs*	NEUTRIK – JACK TS/TRS – 6.35mm TIP : (+) Signal RING : (–) Signal SLEEVE : NC
5:1 DIRECT *output*	NEUTRIK – 3 points XLR PIN 1 : NC PIN 2 : (+) Signal PIN 3 : (–) Signal

– *BT36* –

The Lefson *BT36* is a 36V alternative low voltage power supply, dedicated to the Lefson *DCAD*. The *BT36* works with both 115V and 230V mains voltages. Two voltage selectors "VOLTAGE SELECTION" allow this choice. They ***must*** be properly switched depending on the value of the voltage used. In all cases the two slide switches ***must*** have the same position.

A fuse and varistor protection is included. The aluminum housing of the *BT36* is connected to earth.

The electrical connection is made via a standard IEC C14 male socket. The connection to the *DCAD* is made by using a female Binder 693 type socket.

As part of the evolution of the product, these features may have to change.

Environmental Specifications*	
Operating temperature	+5 à 30 deg. C
Relative humidity	20 à 80 %
*Altitude***	0 à 3000m

*Recommended operating

** Above sea level

Physical Specifications	
Dimensions (mm)	182,7 x 137,5 x 68,2
Dimensions of the box (mm)	171,5 x 120,6 x 54,9
Weight	1060g
Supply	115/230V AC
Current	0.26/0.13A
Frequency	50/60 Hz
Output voltage	36V AC
115V powering fuse	T315mAL250V (temporised)
230V powering fuse	T160mAl250V (temporised)

Types of Connections	
***POWER** supply*	Male socket – IEC C14
***36VAC SUPPLY** low voltage output*	Female socket – BINDER 693 PIN 1 : AC 36V (live) PIN 2 : AC 36V (neutral) PIN 3 : NC PIN E : EARTH

Note : *In the interest of the development of the device, characteristics and/ or drawing may change without notice.*

Accessories : *Luxurious carrying case, 36Vac 4 pins cable, IEC power cable with European, English or American standards, User Manual, Warranty Card.*

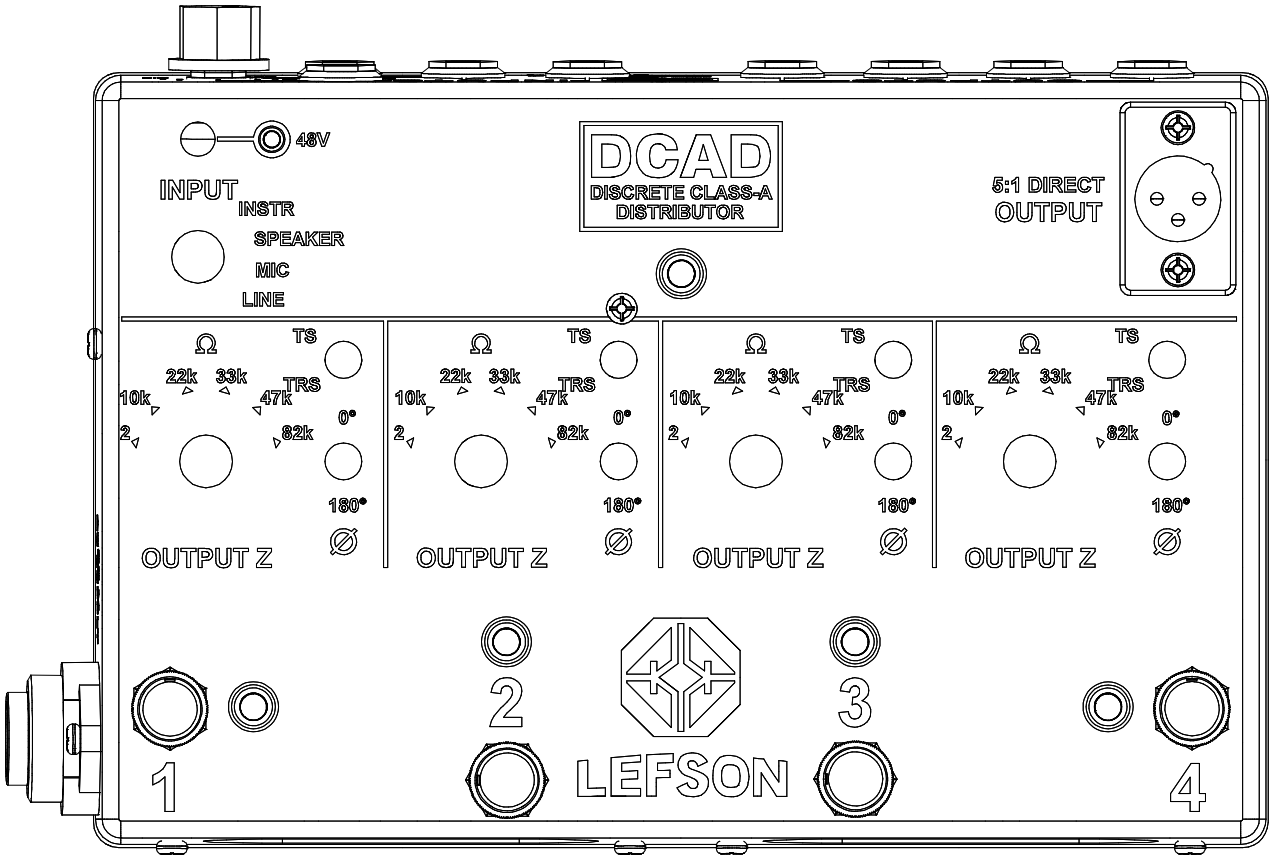
NOTES

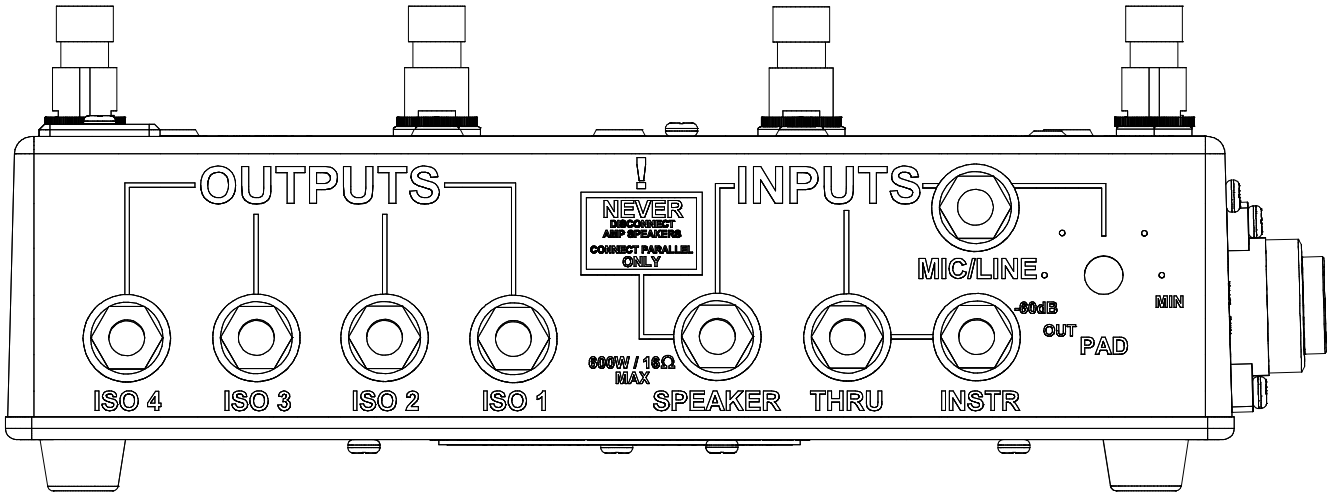
LEFSON

Discrete Class-A Distributor

DCAD

Session Recall Sheet





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Discrete Class-A Distributor

DCAD

Session Recall Sheet

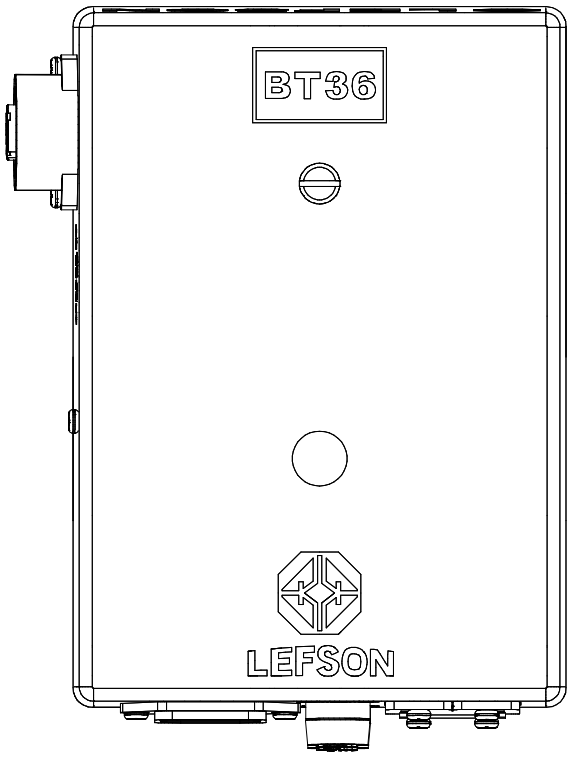
SESSION : .....

DATE : .....

INSTR	
THRU	
SPEAKER	
MIC/LINE	
ISO1	
ISO2	
ISO3	
ISO4	
DIRECT 5:1 OUTPUT	

VOLTAGE SELECTION

115V 230V



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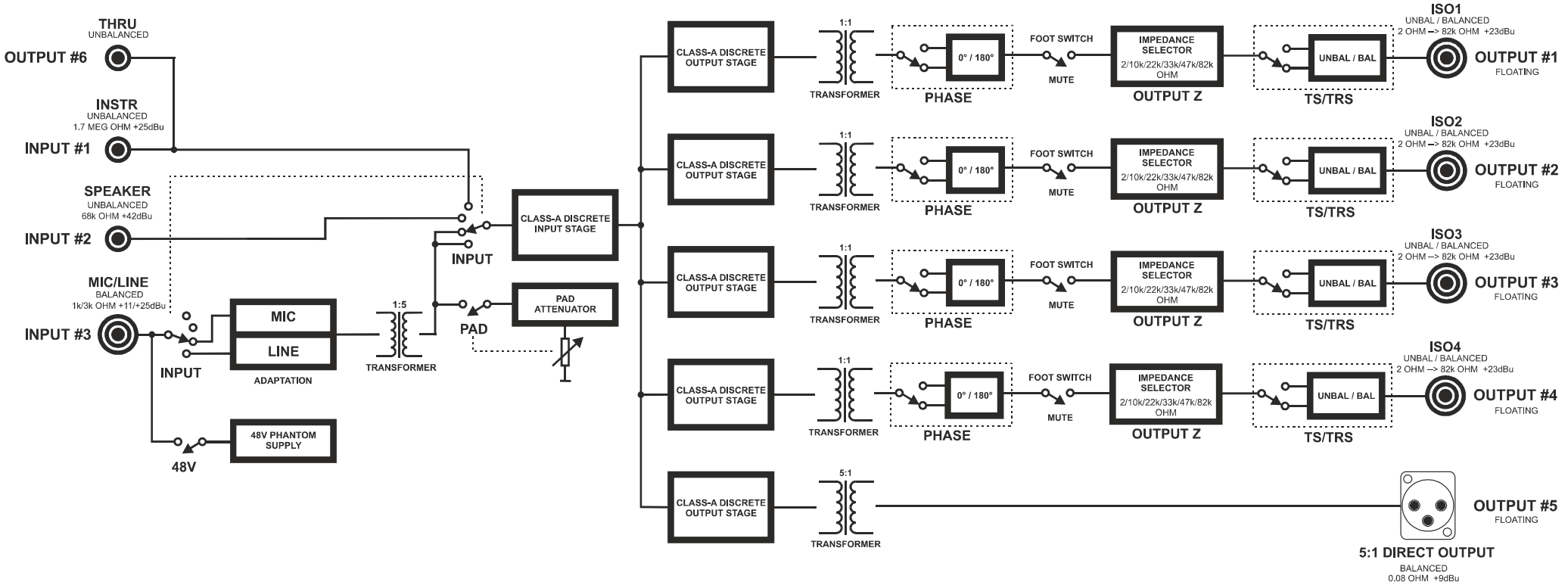

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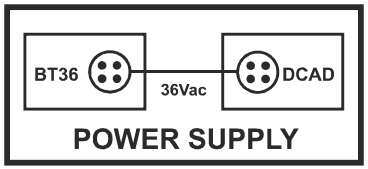
AUDIO CIRCUIT DIAGRAM



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